

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Atty. Docket

RONALDUS M. AARTS ET AL.

PHNL 020901

Serial No.: 10/528,489

Group Art Unit: 2615

Filed: March 18, 2005

Examiner: L.S. Lao

GENERATION OF A SOUND SIGNAL

Commissioner for Patents  
P.O. Box 1450  
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Sir:

APPEAL BRIEF

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(i) Real Party in Interest

The real party in interest in this application is KONINKLIJKE PHILIPS ELECTRONICS N.V. by virtue of an assignment from the inventors recorded on September 7, 2006, at Reel 018216, Frames 0514.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences related to this application.

(iii)        Status of Claims

Claims 1-7 stand finally rejected by the Examiner. The rejection of claims 1-7 is hereby being appealed.

(iv) Status of Amendments

There was one Response filed on July 17, 2007, after final rejection of the claims on April 5, 2007, this Response having been considered by the Examiner.

(v) Summary Of Claimed Subject Matter

The subject invention relates to a method and apparatus for generating at least one output signal (of a first set of sound signals) from at least one input signal (of a second set of sound signals) have a related second set of Head Related Transfer Functions (HRTFs). Ordinarily, a filter is used to apply a HRTF to a sound signal. Hence, for each HRTF, a separate filter is required. An object of the invention is to reduce the number of HRTFs, and correspondingly, the number of filters required.

The method of the subject invention, as claimed in claim 1, includes "determining, for each signal in the second set of sound signals, a weighted relation comprising at least one signal from a third set of intermediate sound signals and at least one weight value". This is described in the specification on page 6, lines 4-12, where, with reference to Fig. 1, each input channel CH1 is described as a weighted version of intermediate channels L and R. This is further described in the specification on page 12, lines 27-31, with reference to step 100 in the flowchart of Fig. 3.

The method of the subject invention, as claimed in claim 1, further includes "determining a first set of Head Related Transfer Functions based on the second set of sound signals, the second set of Head Related Transfer Functions and the weighted relation". This is described in the specification on page 7, line 5 to page 8, line 7, where the determined first set of HRTFs relate to the factors for the two filters needed for, for example, the left headphone driver HPL. This is further described in the specification on page

13, lines 12-24, with reference to step 200 in the flowchart of Fig. 3.

Finally, the method of the subject invention, as claimed in claim 1, includes "transferring at least one signal from the third set of intermediate sound signals by means of at least one HRTF from said first set of Head Related Transfer Functions in order to generate at least one output signal belonging to said first set of sound signals". This is described in the specification on page 13, lines 25-33, with reference to step 300 in the flowchart of Fig. 3.

The subject invention, as claimed in claim 7, further relates to a media system for generating at least one output signal from a first set of sound signals from at least one input signal from a second set of sound signal having a related second set of Head Related Transfer Functions. This is shown in Fig. 2 and described in the specification on page 11, lines 11-13 and page 12, lines 3-21.

In particular, the media system includes "means for determining for each signal in the second set of sound signals, a weighted relation comprising at least one signal from a third set of intermediate sound signals and at least one weight value". This is described in the specification on page 6, lines 4-12, where, with reference to Fig. 1, each input channel CH1 is described as a weighted version of intermediate channels L and R. This is further described in the specification on page 12, lines 27-31, with reference to step 100 in the flowchart of Fig. 3.



The media system of the subject invention, as claimed in claim 7, further includes "means for determining a first set of Head Related Transfer Functions based on the second set of sound signals, the second set of Head Related Transfer Functions and the weighted relation". This is described in the specification on page 7, line 5 to page 8, line 7, where the determined first set of HRTFs relate to the factors for the two filters needed for, for example, the left headphone driver HPL. This is further described in the specification on page 13, lines 12-24, with reference to step 200 in the flowchart of Fig. 3.

Finally, the media system of the subject invention, as claimed in claim 7, includes "means for transferring at least one signal from the third set of intermediate sound signals by means of at least one HRTF from said first set of Head Related Transfer Functions in order to generate at least one output signal belonging to said first set of sound signals". This is described in the specification on page 13, lines 25-33, with reference to step 300 in the flowchart of Fig. 3.

(vi) Grounds of Rejection to be Reviewed on Appeal

- (A) Whether the invention, as claimed in claims 1-7, is anticipated, under 35 U.S.C. 102(b), by U.S. Patent 5,742,689 to Tucker et al.

(vii) Arguments

(A) Whether Claims 1-7 Are Anticipated By Tucker et al.

35 U.S.C. 102(b) states:

" person shall be entitled to a patent unless -

...

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

...."

The Tucker et al. patent discloses a method and device for processing a multichannel signal for use with a headphone, in which multi-channel audio signals, each channel corresponding to a loudspeaker placed in a particular location in a room, are processed in such a way as to create, over headphones, the sensation of multiple "phantom" loudspeakers placed throughout the room. Head Related Transfer Functions (HRTFs) are chosen according to the elevation and azimuth of each intended loudspeaker relative to the listener, each channel being filtered with an HRTF such that when combined into left and right channels and played over headphones, the listener senses that the sound is actually produced by phantom loudspeakers placed throughout the "virtual" room.

As noted in MPEP § 2131, it is well-founded that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir.

1987). Further, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The Examiner, referencing col. 4, line 45 to col. 5, line 35, has indicated that Tucker et al. discloses "means (11) for determining for each signal in the second set of sound signals, a weighted (such as, 16-19 scaling factor) relation comprising at least one signal from a third set of intermediate sound signals (58) and at least one weight value (16, scaling factor)".

Appellants submit that the Examiner is mistaken. In particular, item 11 in Tucker et al. is an HRTF processor for processing an input signal (e.g., the "right" signal 8 with an HRTF. While the output from HRTF 11 is applied to a scaler 17, this does not comport with the claimed limitation in which each signal in the second set of sound signals is determined by a weighted relation including at least one signal from a third set of intermediate sound signals and at least one weight value.

The Examiner has indicated that Tucker et al. discloses "means (10) for determining a first set of Head Related Transfer Functions based on the second set of sound signals (11), the second set of Head Related Transfer Functions and the weighted relation".

Appellants submit that the Examiner is mistaken. In particular, item 10 is the HRTF processor for the left speaker, while item 11 is the HRTF processor for the right speaker. There is no disclosure or suggestion in Tucker et al. that the HRTF processor 10 is based or determined, at least in part, on the HRTF processor 11. In particular, Tucker et al. at col. 4, line 65 to col. 5, line 10, states:

"In an exemplary embodiment of the present invention, the best match set of HRTFs are selected from an ordered set of HRTFs stored in ROM 65 via the HRTF matching processor 59 and routed to the appropriate HRTF processor 10, 11, 12, 13 and 14.

"Prior to the listener selecting a best match set of HRTFs, sets of HRTFs stored in the HRTF database 63 are processed by an HRTF ordering processor 64 such that they may be stored in ROM 65 in an order sequence to optimize the matching process via HRTF matching processor 59. Once the optimal pair of HRTFs have been selected by the listener, separate HRTFs are applied for the right and left ears, converting each input channel to dual channel output."

Appellants stress that the HRTFs used in the HRTF processors of Tucker et al. are selected from a set of HRTFs. There is no disclosure of a first set of Head Related Transfer Functions being determined "based on the second set of sound signals (11), the second set of Head Related Transfer Functions and the weighted relation". It should be noted that Head Related Transfer Functions (HRTFs) operate on sound signals and are not the output sound signals. This is explained in Tucker et al. at col. 4, lines 55-57, which states "Processing of each channel is accomplished through digital filtering using sets of HRTF coefficients, for example, via HRTF processing circuits 10, 11, 12, 13 and 14." Hence, contrary to the Examiner's interpretation, the means 10 of Tucker et al. does

not determine a first set of Head Related Transfer Functions, but rather operates on a sound signal using a HRTF to produce an output signal.

In addition, the Examiner has indicated that Tucker et al. discloses "means (11) for transferring at least one signal from the third set of intermediate sound signals (58) by means (11) of at least one HRTF from said first set of Head Related Transfer Functions in order to generate at least one output (30) signal belonging to said first set of sound signals (10 and see col. 4 line 45-col. 5 line 35)."

Again, Appellants submit that the Examiner is mistaken, in that there is no disclosure of a first set of HRTFs determined, at least in part, from a second set of HRTFs, and that the first set of HRTFs are applied to at least one signal from a third set of intermediate sound signals to form at least one output signal.

The Examiner further adds:

"It is noted that in Tucker, the interactions of various sets of HRTFs are carried out through the operation of the HRTF database 63, as well as the ordering processor 64 and matching processor 58. Tucker collects and stores, in database 63, sets of HRTFs (both left and right configurations) from the listeners. Such HRTFs are subsequently selected and incorporated into the weighing/scaling processing to produce the output left and right values. See, for example, fig.s 4, 6c, col. 4, line 45 - col. 5, line 35; col. 7, lines 10-15, 36-47; col. 9, lines 30-54."

Appellants submit, however, that there is no disclosure or suggestion in Tucker et al. that the HRTF database 63, the ordering processor 64 and the matching processor 58 determine "a first set of Head Related Transfer Functions based on the second set of sound

signals (11), the second set of Head Related Transfer Functions and the weighted relation".

Based on the above arguments, Appellants believe that the subject invention is neither anticipated nor rendered obvious by the prior art and is patentable thereover. Therefore, Appellants respectfully request that this Board reverse the decisions of the Examiner and allow this application to pass on to issue.

Respectfully submitted,

by /Edward W. Goodman/  
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1. (Original) A method of generating, in a media system, at least one output signal from a first set of sound signals from at least one input signal from a second set of sound signals having a related second set of Head Related Transfer Functions, said method  
5 comprising the steps of

- determining, for each signal in the second set of sound signals, a weighted relation comprising at least one signal from a third set of intermediate sound signals and at least one weight value;

10 • determining a first set of Head Related Transfer Functions based on the second set of sound signals, the second set of Head Related Transfer Functions and the weighted relation; and

- transferring at least one signal from the third set of intermediate sound signals by means of at least one HRTF from said  
15 first set of Head Related Transfer Functions in order to generate at least one output signal belonging to said first set of sound signals.

2. (Original) A method according to claim 1, characterized in the step of determining for each signal,  $i$  in the second set of sound signals determines  $CH_i = \alpha_i \cdot L + \beta_i \cdot R$ , wherein  $\alpha_i$ , and  $\beta_i$  each is the weight value, and wherein  $L$  and  $R$  each is a signal from  
5 said third set of intermediate sound signals.



3. (Original) A method according to claim 1, characterized in the step of determining for each signal determines  $CHI_1 = \alpha_{i1} \cdot M$  and  $CHI_2 = \alpha_{i2} \cdot M$ , wherein  $\alpha_{i1}$  and  $\alpha_{i2}$  each is the weight value, and wherein  $CHI_1$  and  $CHI_2$  each is a signal from said third set of  
5 intermediate sound signals.

4. (Previously Presented) A method according to claim 1, characterized in that the media system is a TV, a CD player, a DVD player, a Radio, a display, an amplifier, a headphone or a VCR.

5. (Previously Presented) A computer system for performing the method according to claim 1.

6. (Previously Presented) A computer program product comprising program code means stored on a computer readable medium for performing the method of claim 1 when the computer program is run on a computer.

7. (Original) A media system for generating at least one output signal from a first set of sound signals from at least one input signal from a second set of sound signals having a related second set of Head Related Transfer Functions, said media system  
5 comprising:

- means for determining for each signal in the second set of sound signals, a weighted relation comprising at least one signal

from a third set of intermediate sound signals and at least one weight value;

- 10 • means for determining a first set of Head Related Transfer Functions based on the second set of sound signals, the second set of Head Related Transfer Functions and the weighted relation; and
  - means for transferring at least one signal from the third set of intermediate sound signals by means of at least one HRTF
- 15 from said first set of Head Related Transfer Functions in order to generate at least one output signal belonging to said first set of sound signals.

(ix) Evidence Appendix

There is no evidence which had been submitted under 37 C.F.R. 1.130, 1.131 or 1.132, or any other evidence entered by the Examiner and relied upon by Appellant in this Appeal.

(x) Related Proceedings Appendix

Since there were no proceedings identified in section (ii) herein, there are no decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 C.F.R. 41.37.